MAXDATA Server PLATINUM 3200 I

User's Manual

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1 Setting up the System

Server Position

Please take note of the following criteria for creating a practical and safe workplace when setting up your computer:

⚠ The system can be used anywhere the temperature is suitable for people. However, rooms with humidity over 70 %, and dusty or dirty areas are not appropriate. In addition, do not expose the server to any temperatures over +30 °C or under +10 °C.

⚠ Make sure that the cables connecting the server to peripheral devices are not tight.

⚠ Make sure that all power and connection cables are positioned so that they are not trip hazards.

⚠ When you save data to your server's hard disks or to a floppy disk, they are stored as magnetic information on the media. Make sure that they are not damaged by magnetic or electromagnetic fields.

⚠ Because the electronics in your computer can be damaged by jarring, no mechanical devices should be placed on the same surface as the server. This is especially important for impact printers whose vibrations could damage the hard disk.

⚠ Please take care to ensure a free air flow to the server at all times. Do not block the ventilation slots of the server case and particularly the power supplies. An insufficient air flow may damage the server and / or it's components.

⚠ **ATTENTION**

In order to fully separate the server from current, the power cord(s) must be removed from the wall outlet.

Back Panel Features

The diagram and table show the back panel connectors and LEDs. For information about LEDs, see "Light-Guided Diagnostics" on page 27.

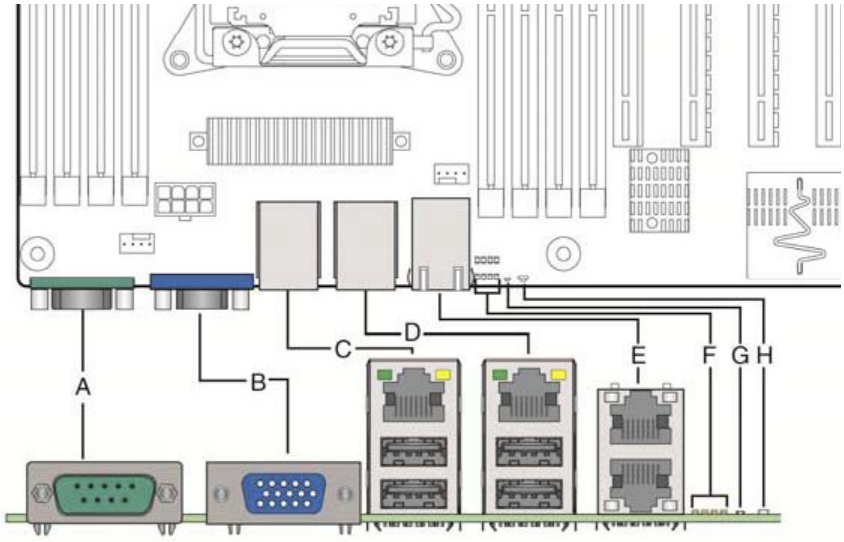

Figure 1. Back panel connectors and LEDs

A. Serial port A
B. Video port
C. NIC 1 (top), two USB ports (bottom)
D. NIC 2 (top), two USB ports (bottom)
E. NIC 3 (top) and 4 (bottom) (optional)
F. Diagnostic LEDs
G. ID LED
H. Status LED

The NIC LEDs at the right and left of each NIC provide the following information.

Table 1. NIC LEDs

LED	LED state	Description
Left LED	**Off**	No network connection is in place
	Solid green	Network connection is in place
	Blinking green	Transmit/receive activity is occurring
Right LED	**Off**	10 Mbps connection (if left LED is on or blinking)
	Solid green	100 Mbps connection
	Solid amber	1000 Mbps connection

Front Panel Controls and Indicators

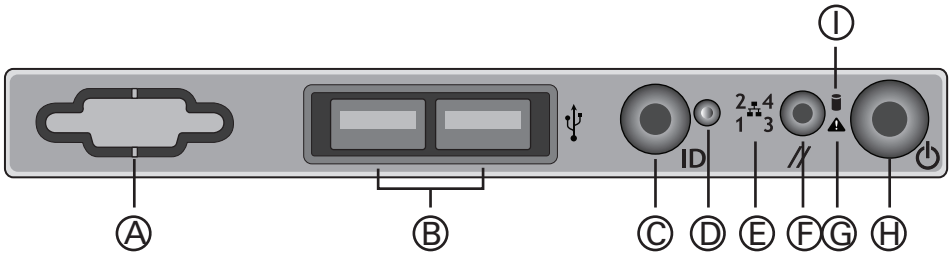

Figure 2. Front panel controls and indicators

A. Reserved for optional serial or video port
B. USB ports
C. ID button with ID LED
D. NMI button
E. NIC activity LED
F. Reset button
G. Status LED
H. Power button with power LED
I. HDD activity LED

The hot-swap HDDs are equipped with LEDs providing information about the current status of the respective HDD.

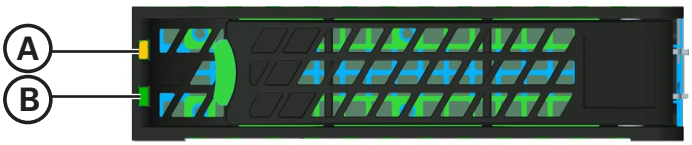

Figure 3. HDD LEDs

Caption	LED	LED state	Description
A.	**Status LED, amber**	**Off**	Drive bay not in use or no error
		On	Hard drive fault
		Blinking (1 Hz)	RAID rebuild in progress
		Blinking (2 Hz)	Drive identification on
B.	**Activity LED, green**	**On**	SAS HDD: powered on, no activity
		Off	• SATA HDD: powered on, no activity • HDD powered but motor is stopped (power savings mode)
		Blinking	• SAS HDD: LED blinks off when processing command • SATA HDD: LED blinks on when processing command • SAS HDD spinning up

Descriptions of the front panel LEDs are listed in the following table.

Table 2. Description of front panel LEDs

LED	Color	Condition	Description
Power LED	**Green**	**ON**	Power on
		OFF	Off
Status	**Green**	**ON**	System ready
	Green	**BLINK**	System ready, but degraded: redundancy lost such as PS or fan failure; one of several DIMMs not ready; non-critical temperature/voltage threshold
	Amber	**BLINK**	Non-critical failure: critical temperature/voltage threshold; minimum number fans not present or failed; voltage regulator overheated
	Amber	**ON**	Critical alarm: CPU 1 missing or failure; voltage fault; no memory present; BMC/video memory failure
		OFF	AC power off; powered down (DC-off state or S5), and no degraded, non-critical, critical conditions exist*
HDD activity	**Green**	**BLINK**	Hard drive activity
NIC activity	**Green**	**ON**	Linked
	Green	**BLINK**	LAN activity
		OFF	Idle
ID LED	**Blue**	**BLINK**	Server identification; toggled by ID button or software
		OFF	Server identification; toggled by ID button or software

* When the server is powered down (transitions to the DC-off state or S5), the BMC is still on standby power and retains the sensor and front panel status LED state established before the power-down event. If the system status is normal when the system is powered down (the LED is in a solid green state), the system status LED will be off.

2 Chassis Description

Feature Summary

Table 3. Feature summary

Feature	Description
Peripheral bays	3 bays for 5.25" drives
HDD bays	Depending on the model, one of the following configurations: • 8 bays for fixed 2.5"/3.5" HDDs • 8 hot-swap 2.5" bays and 4 non-hot-swap 3.5" bays • 16 hot-swap 2.5" bays • 4 hot-swap 3.5" bays and 4 non-hot-swap 3.5" bays • 8 hot-swap 3.5" bays
Expansion slots	6 full-length PCI expansion slots
Power supply	a) PLATINUM 3200 I, base chassis: 1 single 550 W power supply (80 PLUS Silver) b) PLATINUM 3200 I, redundant chassis: 2 redundant 750 W hot swap power supplies (Cold Redundant Power, 80 PLUS Platinum)
Cooling	a) PLATINUM 3200 I, base chassis: 2 non-redundant 120 mm fans b) PLATINUM 3200 I, redundant chassis: 5 redundant 80 mm fans (n+1 redundancy)

Base – Chassis Front View

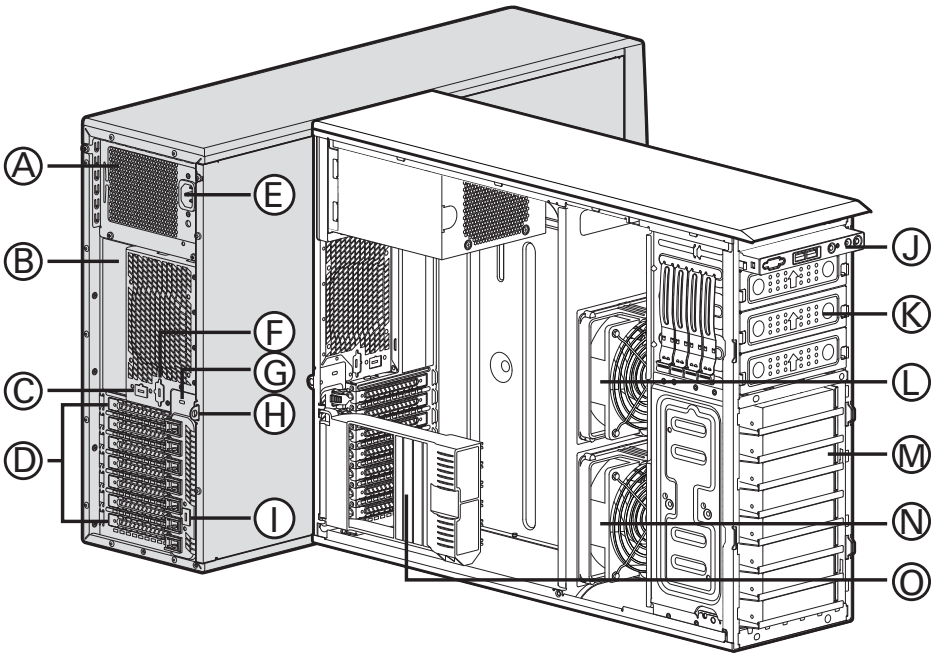

Figure 4. MAXDATA PLATINUM 3200 I Base – Overview

- **A.** 550 W fixed power supply
- **B.** I/O ports
- **C.** Alternate RMM 4 knockout
- **D.** PCI add-in board slot covers
- **E.** AC input power connector
- **F.** Serial port knockout
- **G.** Kensington cable lock mounting hole
- **H.** Padlock loop
- **I.** Alternate RMM 4 knockout
- **J.** Front control panel
- **K.** 5.25" peripheral bays
- **L.** CPU zone system fan
- **M.** Fixed hard drive carrier tray
- **N.** PCI zone system fan
- **O.** PCI card retainer

Redundant – Chassis Front View

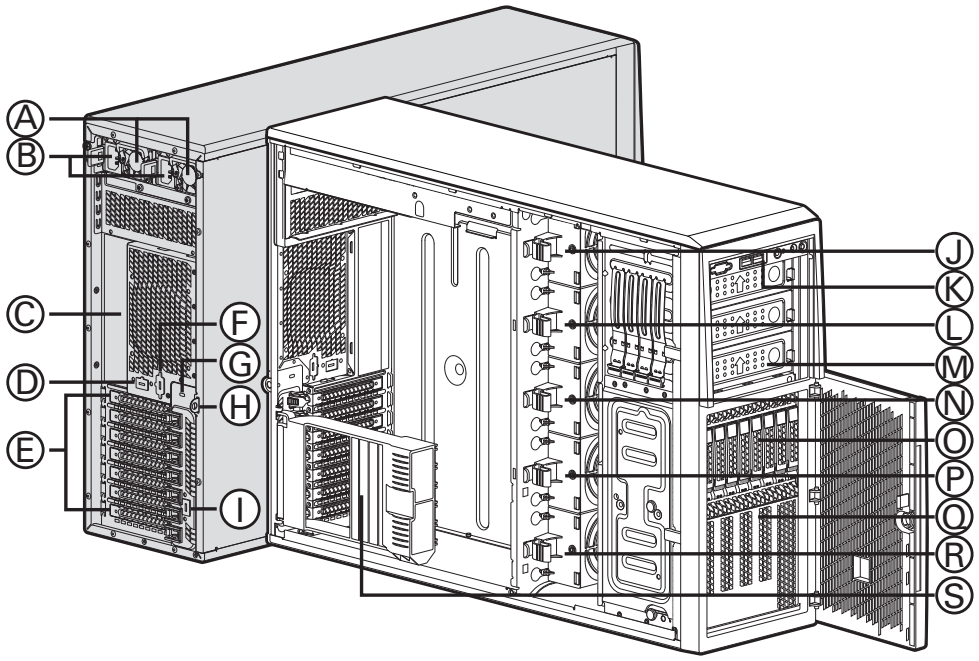

Figure 5. MAXDATA PLATINUM 3200 I Redundant – Overview

A. Two 750 W hot-swap power supplies

B. Two AC input power connectors

C. I/O ports

D. Alternate RMM 4 knockout

E. PCI add-in board slot covers

F. Serial port knockout

G. Kensington cable lock mounting hole

H. Padlock loop

I. Alternate RMM 4 knockout

J. Hot-swap system fan 5

K. Front control panel

L. Hot-swap system fan 4

M. 5.25" peripheral bays

N. Hot-swap system fan 3

O. Hot-swap HDD cage

P. Hot-swap system fan 2

Q. HS HDD EMI cover

R. Hot-swap system fan 1

S. PCI card retainer

3 Setting up the Chassis

This chapter describes how to set up your server chassis for the first time.

Tools and Supplies Needed

- Phillips (cross head) screwdriver (#2 bit)
- Small flat-head screwdriver
- Anti-static wrist strap (recommended)

Safety: Before You Remove the Access Cover

Before removing the access cover for any reason, observe these safety guidelines:

- Turn off all peripheral devices connected to the server.
- Turn off the server by pressing the power button on the front of the chassis. Then unplug the AC power cord(s) from the chassis or wall outlet.
- Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the chassis.
- Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground – any unpainted metal surface – when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove the access cover(s) to access components inside the server. Only a technically qualified person should integrate and configure the server.

⚠ WARNINGS

The power button on the front panel DOES NOT turn off the AC power. To remove power from server, you must unplug the AC power cord(s) from the wall outlet or the chassis.

Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord(s), telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.

⚠ CAUTIONS

ESD can damage disk drives, boards, and other parts. Perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground – any unpainted metal surface – on your server when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. Do not touch the connector contacts. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. If you place the server board on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Use a conductive foam pad if available. Do not slide board over any surface.

For proper cooling and airflow, always install the access cover before turning on the server. Operating it without the cover in place can damage system parts.

Removing the Primary Access Cover

When facing the front of the chassis, the primary access cover is on the left-hand side for pedestal-mounted servers, and on top for rack-mounted servers.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Power off the system and disconnect the power cable.
3. Remove the screws (A).
4. Slide the primary access cover toward the rear of the chassis (B).
5. Lift the primary access cover outward to remove it.

NOTE

The cover must be installed during system operation in order to ensure proper cooling.

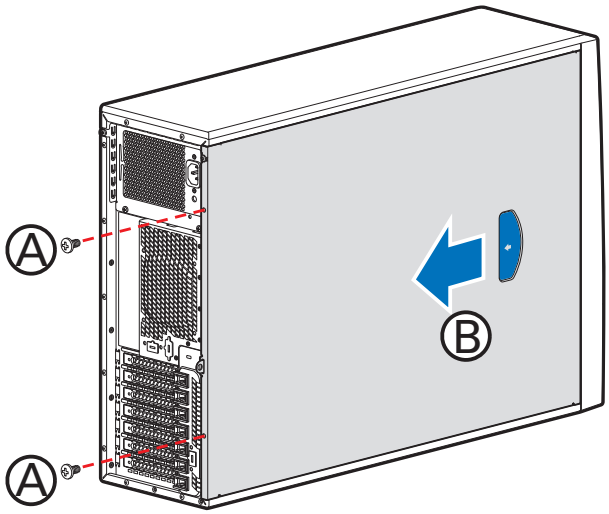

Figure 6. Removing the access cover

Removing the Bezel Assembly

1. Release the two plastic tabs (A) on the left side of the bezel assembly to disengage the tabs.
2. Rotate the bezel assembly (B) no more than 40 degrees outward.
3. Pull the bezel assembly away from the chassis.

NOTE

Do not rotate the bezel assembly more than 40° outward in order to avoid damaging the bezel hooks at the right side of the bezel assembly.

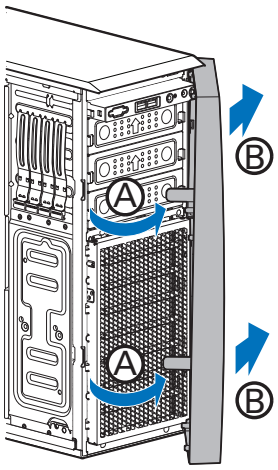

Figure 7. Removing the bezel assembly

Installing a DVD or CD-ROM Drive

1. Press the release latch and use the finger holes to pull out the EMI shield (A).

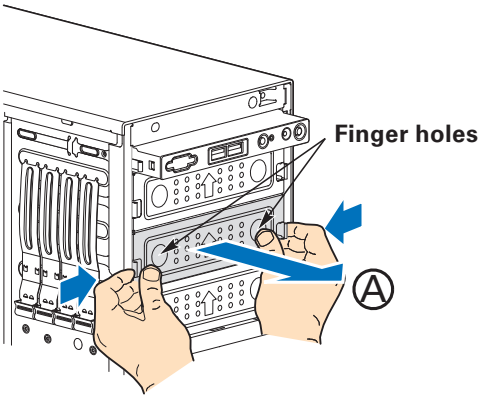

Figure 8. Removing the EMI shield

2. Get two slides from the chassis side (B).
3. Attach the slides to the DVD or CD-ROM drive by pressing the slides firmly into the side dimples on the DVD or CD-ROM drive (C).
4. Insert the drive/slide assembly into the device bay until the slides lock into place.
5. Connect the power and data cables.

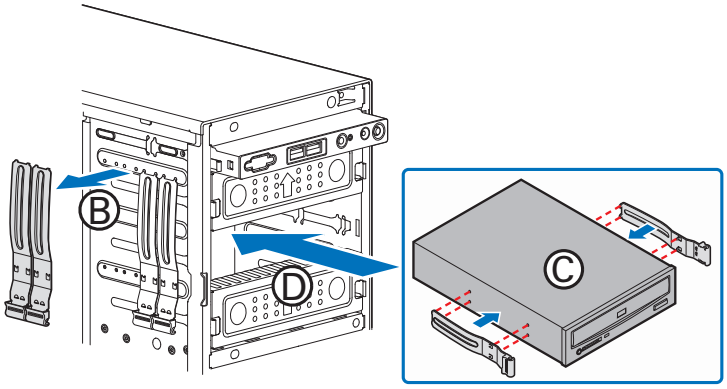

Figure 9. Installing a DVD or CD-ROM drive

Installing Hard Drives

Depending on the chassis model, the HDD installation may vary:

- HDD installation in non-hot-swap HDD cage (no exchange of HDDs during operation)
- HDD installation in hot-swap HDD cage (exchange of HDDs during operation is possible)

NOTE

Each HDD carrier must be equipped with either an HDD or a plastic drive blank to maintain proper system cooling.

Non-hot-swap HDD cage

1. Remove the EMI shield by pressing the clip and pushing the shield gently to the left. Lift the shield off.

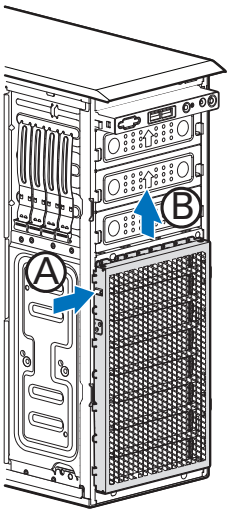

Figure 10. Removing the EMI shield

2. Pull out the HDD carrier tray.
3. Secure the 3.5" or 2.5" HDD on the HDD carrier tray with screws.
4. Insert the HDD carrier tray into chassis.

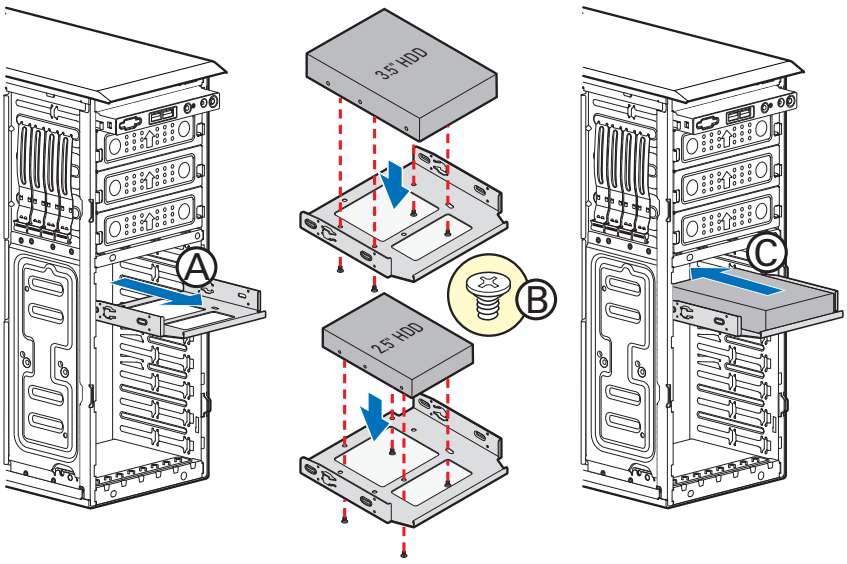

Figure 11. Installing an HDD

5. Fit the edges of the EMI shield against the sides of the chassis.
6. Slide the EMI shield downward until the latches on the EMI shield are engaged with the chassis.

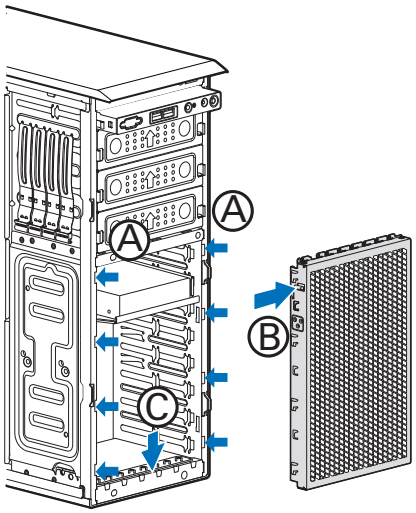

Figure 12. Installing the EMI shield

Hot-swap HDD cage

1. Remove the drive carrier by pressing the green button and opening the lever. Slide the carrier out.

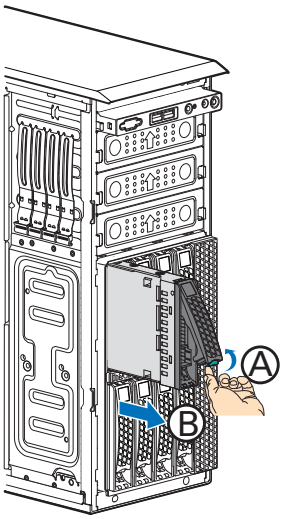

Figure 13. Removing a drive carrier from hot-swap HDD cage

2. Remove the four screws securing the plastic retention device and remove the plastic retention device.

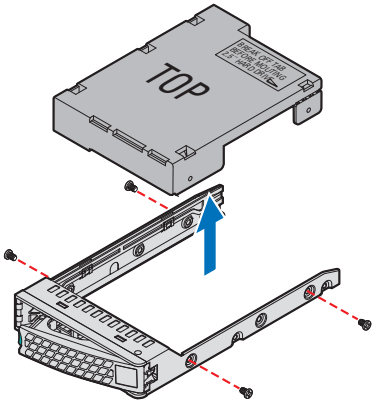

Figure 14. Removing the plastic retention device

3. Insert the hard disk drive into the drive carrier. Make sure the connector end of the drive matches the backplane connector.
4. Install the hard disk drive using the four screws you removed in step 2.

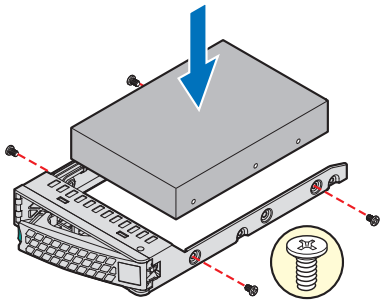

Figure 15. Installing an HDD in drive carrier

5. With the lever open, insert the hard disk drive assembly into the cage opening and push until the locking lever engaged. Push in the lever to lock it into place.

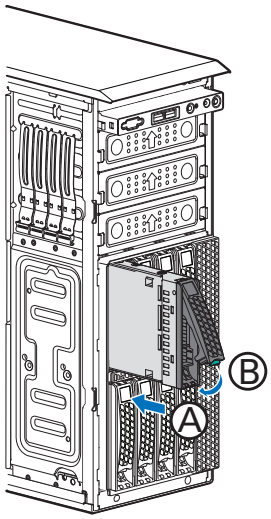

Figure 16. Installing a drive carrier in the hot-swap HDD cage

Installing/Removing the Air Duct

Installing the Air Duct

1. Align the air duct and chassis rail.
2. Install the air duct. Ensure that alignment holes (D) and tabs (C) match up.

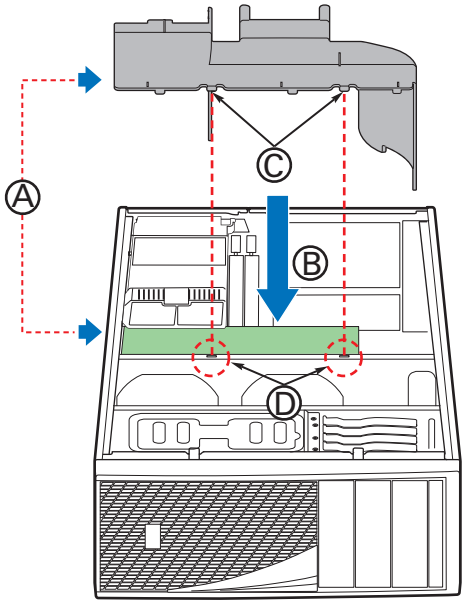

Figure 17. Installing the air duct

Removing the Air Duct

Pull the air duct gently up and out of the chassis.

4 Server Board Features

This chapter briefly describes the main features of the PLATINUM 3200 I Server Board. It provides a list of the server board features and diagrams showing the location of important components and connections on the server board.

Table 4. Server board features

Feature	Description
Server board	Intel® S2600CP
Processor	One or two Intel® Xeon® E5-2600 processors with up to 130 W thermal design power (TDP)
System memory	• 16 DIMM slots, 8 per processor on 4 memory channels • Up to 512 GB system memory using 16-GB LRDIMMs • 800/1066/1333/1600 MT/s ECC Unbuffered (UDIMM), Registered (RDIMM) or Load Reduced (LRDIMM) DDR3 memory • Mixing UDIMMs, RDIMMs and LRDIMMs is not supported • DDR3 standard I/O voltage of 1.5 V and DDR3 Low Voltage of 1.35 V
Chipset	• Intel® C600 Platform Controller Hub (PCH) with integrated storage controller unit (SCU) • RAID upgrade keys supported for the SCU ports
Peripheral interfaces	External connections: • One DB-15 video connector • One DB-9 serial port A connector • Four RJ-45 network ports for 10/100/1000 Mbit/s • Four USB 2.0 ports on back panel • Two USB 2.0 ports on front panel Internal connections: • One USB connector for two front-panel USB 2.0 ports • One type A USB 2.0 port • One DH-10 connector for serial B port • Two SATA III ports (6 Gbit/s) • Four SATA II ports (3 Gbit/s) • Eight SAS/SATA ports with 3 Gbit/s (feature activation with RAID upgrade keys; four SATA ports enabled by default) • Remote Management Module 4 network and feature key ports
RAID support	• Intel® RSTe software RAID 0/1/10/5 • LSI software RAID 0/1/10 (RAID 5 on SCU ports with appropriate activation key)
Graphics	• On-board Matrox G200 2D video controller • 16 MB graphics memory
LAN	Intel® I350 controller with two or four 10/100/1000 Mbit/s Ethernet LAN ports
Add-in card slots	From first processor: • 3 × PCIe Gen III x8 (slots 1, 2, 4) • 1 × PCIe Gen III x8 with open-ended physical connector (slot 3) • 1 × PCIe Gen III x8 with x16 connector (slot 6) From second processor: • 1 × PCIe Gen III x8 with open-ended physical connector (slot 5)
Server management	• Onboard ServerEngines LLC Pilot III controller • Support for Intel® Remote Management Module 4 solutions • Intel® Light-Guided Diagnostics on field replaceable units • Support for Intel® System Management Software • Support for Intel® Intelligent Power Node Manager

Connector and Header Locations

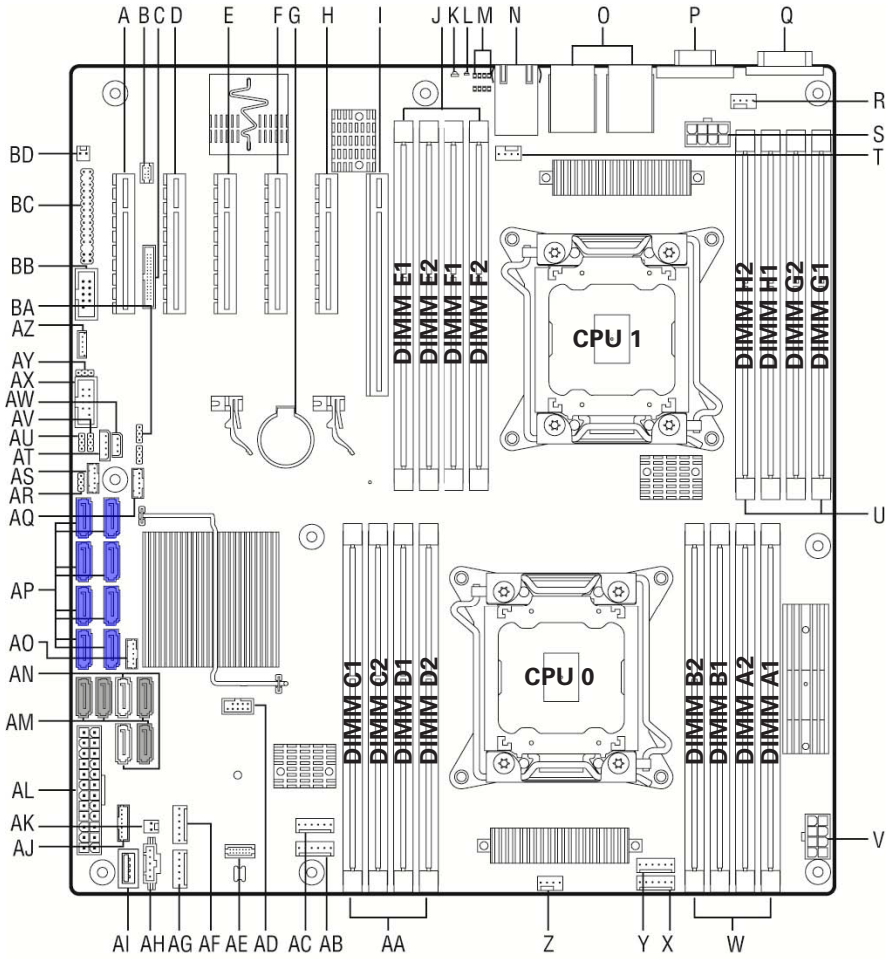

Figure 18. Server board connector and component locations

A.	Slot 1 (PCIe 3.0)	**T.**	System fan 7	**AM.**	SATA II ports (3 Gbit/s)
B.	RMM 4 LITE	**U.**	DIMM H1/H2/G1/G2	**AN.**	SATA III ports (6 Gbit/s)
C.	RMM 4 NIC	**V.**	CPU 1 power	**AO.**	SATA SGPIO
D.	Slot 2 (PCIe 3.0)	**W.**	DIMM A1/A2/B1/B2	**AP.**	SATA/SAS ports (3 Gbit/s)
E.	Slot 3 (PCIe 3.0, open-ended)	**X.**	System fan 5	**AQ.**	SAS SGPIO 2
F.	Slot 4 (PCIe 3.0)	**Y.**	System fan 6	**AR.**	Clear password
G.	CMOS battery	**Z.**	CPU fan 1	**AS.**	SAS SGPIO 1
H.	Slot 5 (PCIe 3.0, CPU 2, open-ended)	**AA.**	DIMM C1/C2/D1/D2	**AT.**	IPMB
I.	Slot 6 (PCIe 3.0)	**AB.**	System fan 3	**AU.**	ME update
J.	DIMM E1/E2/F1/F2	**AC.**	System fan 4	**AV.**	BMC update
K.	Status LED	**AD.**	Internal eUSB SSD port	**AW.**	HSBP_I2C
L.	ID LED	**AE.**	TPM	**AX.**	Front panel USB
M.	Diagnostic LED	**AF.**	System fan 2	**AY.**	BIOS default
N.	NIC 3/4 (optional)	**AG.**	System fan 1	**AZ.**	Intel® C600 RAID upgrade key connector
O.	USB 0/1/2/3, NIC 1/2	**AH.**	PMBus port	**BA.**	BIOS recovery
P.	Video port	**AI.**	Type A USB port	**BB.**	Serial port B
Q.	Serial port A	**AJ.**	LCP	**BC.**	Front panel (24 pins), NIC 3/4 LED (4 pins)
R.	CPU fan 2	**AK.**	HDD activity LED	**BD.**	Chassis intrusion
S.	CPU 2 power	**AL.**	Main power		

Configuration Jumpers

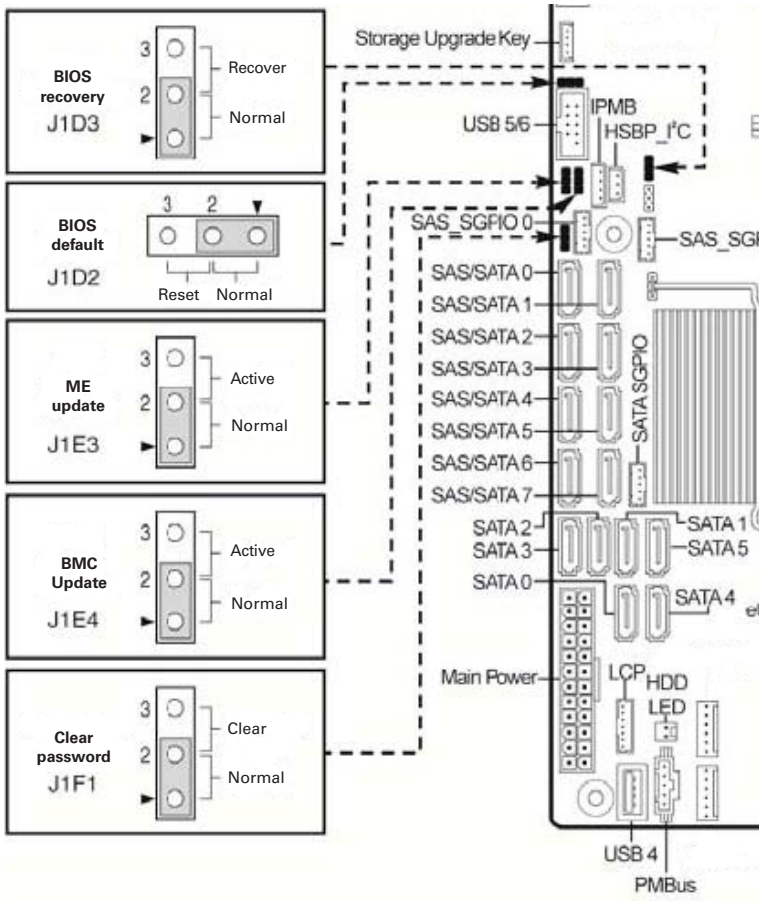

Figure 19. Configuration jumpers

Jumper name	Pins	What happens at system reset
BIOS default (J1D2)	1–2 (Default)	Protect CMOS: These pins should have a jumper in place for normal system operation.
	2–3	If pins 2-3 are connected for 5 to 10 seconds with AC power unplugged, the CMOS settings clear on the next reset. These pins should not be connected for normal operation.
ME update (J1E3)	1–2 (Default)	ME Firmware Force Update Mode – Disabled. These pins should have a jumper in place for normal system operation.
	2–3	ME Firmware Force Update Mode – Enabled. These pins should not be connected for normal operation.
Clear Password (J1F1)	1–2 (Default)	Protect Password: These pins should have a jumper in place for normal system operation.
	2–3	To clear administrator and user passwords, power on the system with pins 2-3 connected. The administrator and user passwords clear in 5 to 10 seconds after power on. These pins should not be connected for normal system operation.
BIOS recovery (J1D3)	1–2 (Default)	These pins should be connected for normal system operation.
	2–3	The main system BIOS does not boot with pins 2-3 connected. The system only boots from EFI-bootable recovery media with a recovery BIOS image present. These pins should not be connected for normal system operation.
BMC update (J1E4)	1–2 (Default)	BMC Firmware Force Update Mode – Disabled. These pins should have a jumper in place for normal system operation.
	2–3	BMC Firmware Force Update Mode – Enabled. These pins should not be connected for normal operation.

Light-Guided Diagnostics

The server board contains diagnostic LEDs to help you identify failed and failing components and to help you identify the server from among several servers. Except for the ID LED, the status LED, and the +5 volt standby LED, the LEDs turn on (amber) only if a failure occurs.

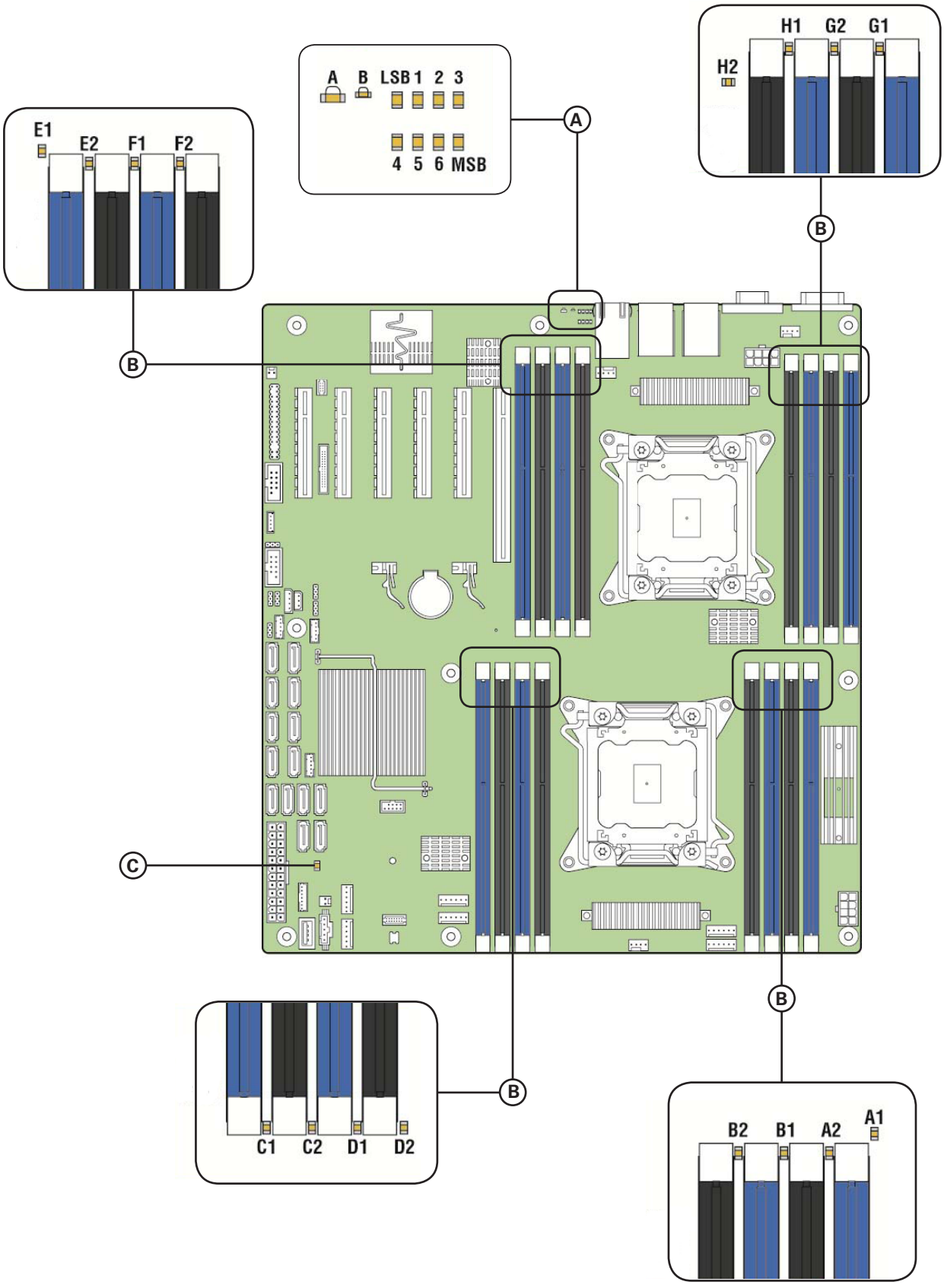

Figure 20. Diagnostic LEDs

Callout	LED	Function
A.	**A:** Status LED	The status LED indicates whether a system is operating correctly, has experienced a minor fault, or a major system error. This LED shows the same status as the front panel status LED.
	B: ID LED	This LED can be turned on and off either by pressing a chassis button or by using system management software. This LED is useful when the system is grouped with several systems, such as in a rack, and you need to easily find the system to perform maintenance on it.
	LSB, 1, 2, 3, 4, 5, 6, MSB: POST LEDs	The sequence of lit POST LEDs is used to identify specific errors that might occur during the boot process. The LED code will help technical support to identify possible problems.
B.	DIMM fault LEDs	These LEDs indicate a fault has occurred with the DIMM installed in the corresponding socket. Replace the faulty DIMM.
C.	+5 volt standby LED	This LED lights up whenever AC power is applied to the system. The system does not need to be powered on in order for this LED to be on.

RAID Support

The server board provides two independent controllers: one on-board SATA controller with two 6-Gbit/s connectors (white) and four 3-Gbit/s connectors (black) and one controller with eight 3-Gbit/s SATA/SAS connectors (blue). The features of the SATA/SAS controller are activated by optional RAID keys. Without RAID keys, the SATA/SAS connectors 0 to 3 are activated in SATA mode. SAS mode and connectors 4 to 7 can be activated by appropriate RAID keys.

The options for controller configuration are located in the BIOS setup under "Advanced" > "Mass Storage Controller Configuration".

- The "AHCI Capable SATA Controller" allows the following settings:
  - "Enhanced" – supports up to six SATA devices in native IDE mode.
  - "Compatibility" – supports up to four SATA ports (0/1/2/3) in legacy IDE mode and two SATA ports (4/5) in native IDE mode.
  - "AHCI" – supports all SATA ports in Advanced Host Controller Interface mode.
  - "RAID Mode" – switches on RAID mode and displays the sub-option „AHCI Capable RAID Options":

    „INTEL® ESRT2 (LSI)" – Intel® Embedded Server RAID Technology II, support for RAID 0, 1 and 10.

    „INTEL® RSTe" – Intel® Rapid Storage Technology Enterprise, support for RAID 0, 1, 5 and 10
- The "SATA/SAS Capable Controller" allows the following settings:
  - „INTEL® ESRT2 (LSI)" – Intel® Embedded Server RAID Technology II
  - „INTEL® RSTe" – Intel® Rapid Storage Technology Enterprise

  RAID support depends on the installed RAID key: For RSTe support (RAID 5), no SAS RAID key must be installed. ESRT2 RAID5 can be activated by RAID keys to support RAID 0, 1, 5 and 10.

Hardware Requirements

Processor

One or two Intel® Xeon® E5-2600 processors must be installed.

System Memory

The server board provides eight memory channels, each with two slots. Channels A to D with DIMM A1, A2, B1, B2, C1, C2, D1 and D2 are assigned to processor 1. Channels E to H with DIMM E1, E2, F1, F2, G1, G2, H1 and H2 are assigned to processor 2. Channels E to H can only be used if processor 2 is populated.

If two processors are populated, then they can both access the entire memory via Intel® QuickPath Interconnect (Intel® QPI).

Within a channel, DIMM 1 must be populated before DIMM 2 can be used.

CPU socket 1								CPU socket 2							
Channel A		Channel B		Channel C		Channel D		Channel E		Channel F		Channel G		Channel H	
A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2

DIMM configuration is shown in the following figure.

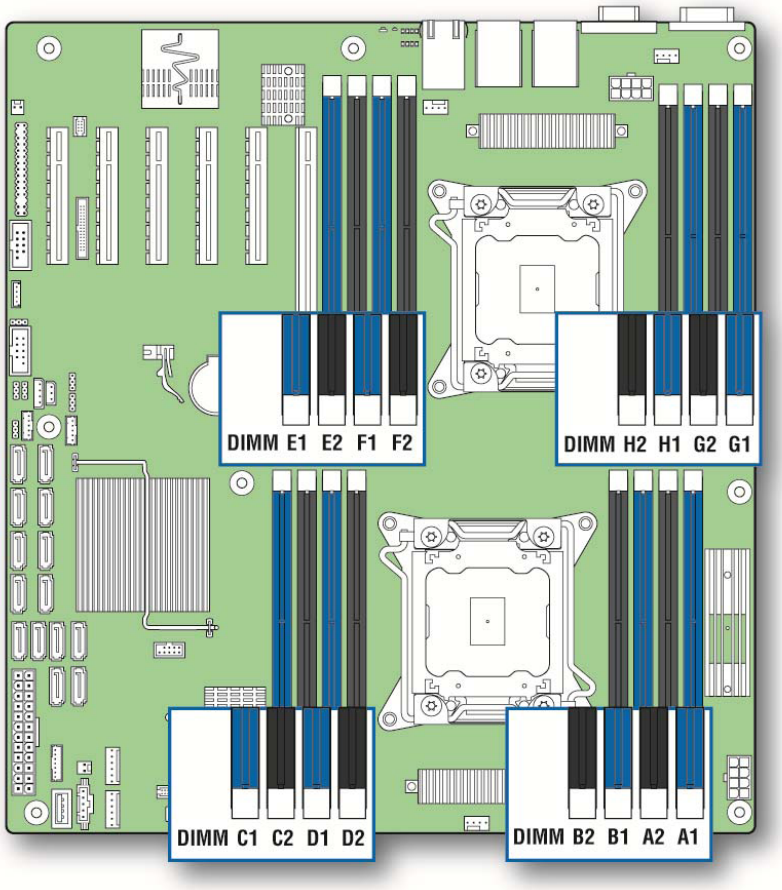

Figure 21. DIMM sockets

Supported memory modules:

- DDR3-DIMM: Unbuffered (UDIMM), Registered (RDIMM) or Load Reduced (LRDIMM)
- Mixing of UDIMMs, RDIMMs and LRDIMMs is not permitted
- 1.5-V and 1.35-V DIMMs (mixing is not permitted)
- DDR3 transfer rates of 800, 1066, 1333 und 1600 MT/s

- 1-Gbit, 2-Gbit and 4-Gbit DDR3 DRAM technology is supported for
  - DDR3 UDIMM – SR: x8 and x16 data bus width; DR: x8 data bus width
  - DDR3 RDIMM – SR, DR and QR: x4 or x8 data bus width
  - DDR3 LRDIMM – QR: x4 and x8 data bus width (direct map or rank multiplication technology, mixing is not permitted)
- Up to 8 ranks per memory channel; 1, 2 or 4 ranks per DIMM

✎ **NOTE**

SR: Single Rank, DR: Dual Rank, QR: Quad Rank

Memory Operating Modes

The following memory operating modes are supported:

- Independent Channel Mode
- Rank Sparing Mode
- Mirrored Channel Mode
- Lockstep Channel Mode

The memory bus operating frequency is always identical for all memory channels.

In Mirrored and Lockstep modes, DIMM sockets must be populated with DIMMs of identical size and organization over all channels.

In Independent Channel mode, the four memory channels of each processor operate independent of each other. The channels can be populated in any order, and the channels can be operated at different DIMM timings.

In Rank Sparing mode, one rank in each channel is reserved as spare. The usable memory is reduced by the memory within this rank. The memory in the spare rank must be equal or greater than the ranks available in the channel.

✎ **EXAMPLE**

Channels A and B are fitted with 4 × 4 GB SR, 1 rank per channel as spare, usable memory: 8 GB

Channels A and B are fitted with 4 × 4 GB DR, 1 rank per channel as spare, usable memory: 12 GB

In Mirrored Channel mode, the content of channels 0 and 2 as well as that of channels 1 and 3 is mirrored. The usable amount of memory is half of the installed memory. Channels 0 and 2 as well as 1 and 3 must be populated with DIMMs of identical size and organization.

In Lockstep Channel mode, memory is accessed at a width of 128 bit across channels 0 and 1 as well as across channels 2 and 3. Lockstep mode is the only mode that supports SDDC (Single Device Data Correction) for x8 DRAM memory. In this mode, channels 0 and 1 as well as channels 2 and 3 must be populated with DIMMs of identical size and organization.

Optional Hardware

Depending on the original configuration, different upgrade options are available for the server. Among these are:

- RAID activation keys for the onboard SATA/SAS ports
- Remote Management Module RMM 4 for advanced remote management features, incl. KVM over IP
- Rack install kit for installing the server in a rack with sliding rails
- Hot-swap cages for 2.5" or 3.5" HDDs
- SAS expander module for addressing several HDDs through a single controller channel

5 Hardware Installations and Upgrades

Before You Begin

Before working with your server product, pay close attention to the safety information in 'Server Position' at the beginning of this manual.

Tools and Supplies Needed

- Phillips (cross head) screwdriver (#1 bit and #2 bit)
- Needle-nosed pliers
- Anti-static wrist strap and conductive foam pad (recommended)

Installing and Removing Memory

The DIMMs are labelled as DIMM_A1 to DIMM_H2 on the board.

Begin populating your memory with DIMM_A1. First add memory in the first socket of each of the following memory channels before installing the DIMMs in the second socket of a channel. In systems with two processors, distribute the memory evenly over both processors. Please refer to Chapter 4 for more detailed information on the system memory.

Installing DIMMs

To install DIMMs, follow these steps:

1. Observe the safety and ESD precautions at the beginning of this book.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the AC power cord(s) from the server.
4. Remove the chassis cover.
5. Remove the memory and processor air duct.
6. Locate the DIMM sockets (see Figure 21 on page 29).
7. Make sure the clips at either end of the DIMM socket(s) are pushed outward to the open position.
8. Holding the DIMM by the edges, remove it from its anti-static package.
9. Position the DIMM above the socket. Align the small notch in the bottom edge of the DIMM with the key in the socket.
10. Insert the bottom edge of the DIMM into the socket.
11. When the DIMM is inserted, carefully push straight down on the top edge of the DIMM until the retaining clips snap into place. Make sure the clips are firmly in place.
12. Reinstall the memory and processor air duct.
13. Replace the chassis cover and reconnect the AC power cord(s).

Installing or Replacing a Processor

CAUTIONS

Processor must be appropriate: You may damage the server board if you install a processor that is inappropriate for your server.

ESD and handling processors: Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

Installing a Processor

To install a processor, follow these instructions:

1. Observe the safety and ESD precautions at the beginning of this book.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the AC power cord(s) from the server.
4. Remove the chassis cover.
5. Remove the memory and processor air duct.
6. Locate the processor sockets (see Figure 18 on page 24).
7. Disconnect and remove any components necessary to access the processor sockets.
8. Open the socket levers: Push down the lever handle on the "OPEN 1st" side and away from the socket to release it (A). Repeat the steps to release the lever on the other side (B).

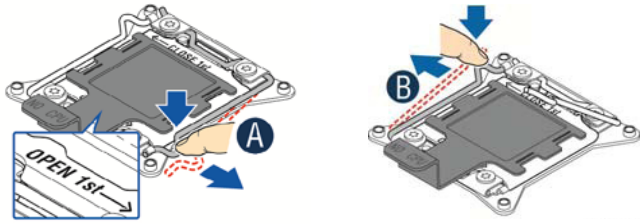

Figure 22. Opening the processor socket levers

9. Open the load plate: Press the locking lever slightly to raise the load plate (A). Open the load plate all the way (B).

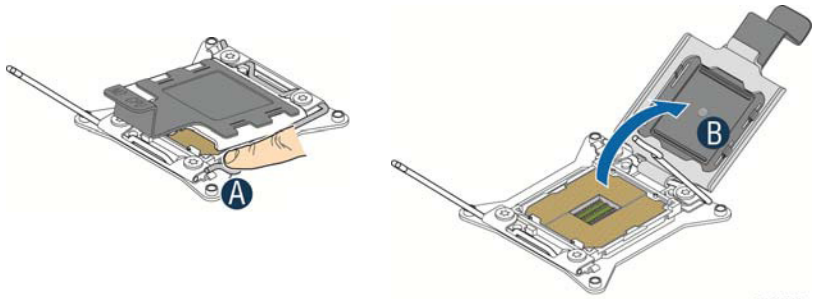

Figure 23. Opening the load plate

10. Install the processor: Take the processor out of the box and remove the protective shipping cover (A). Orient the processor with the socket so that the processor cutouts match the four orientation posts on the socket (B). Note the location of the golden key at corner of processor (C). Gently insert the processor into the socket.

CAUTION

The underside of the processor has components that may damage the socket pins if installed improperly. The processor must align correctly with the socket opening before installation. Do not drop the processor into the socket!

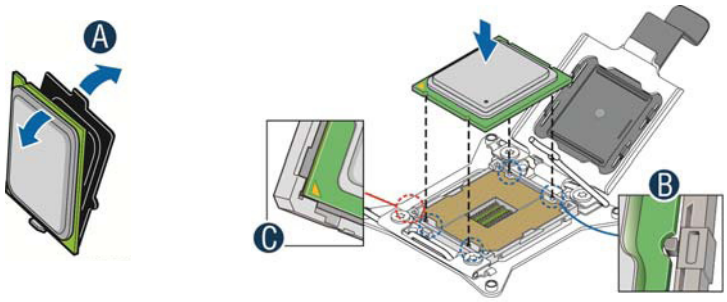

Figure 24. Inserting the processor

11. Remove the protective cover from the load plate and keep it in a safe place for later use.

Figure 25. Removing the protective cover from the load plate

12. Carefully lower the load plate over the processor to close it.

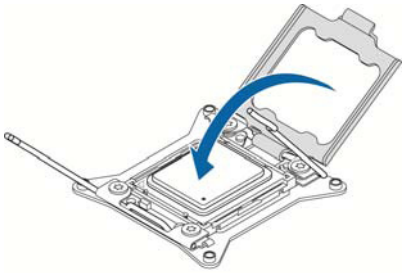

Figure 26. Closing the load plate

13. Latch the locking levers in reverse order compared to opening: Push down the locking lever on the "CLOSE 1st" side (A). Slide the tip of the lever under the notch in the load plate (B). Make sure the load plate tab engages under the socket lever when fully closed. Repeat the steps to latch the locking lever on the other side (C).

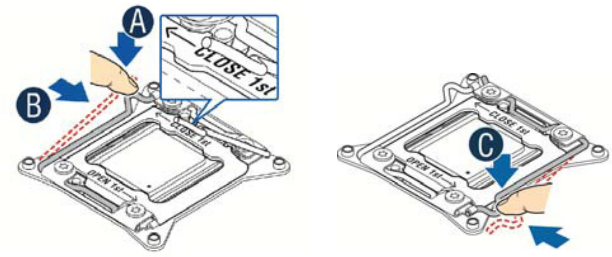

Figure 27. Closing the locking levers

14. Attach the heat sink (see next page).

Installing the Heatsink(s)

1. The heat sink has Thermal Interface Material (TIM) located on the bottom of it. Use caution when you unpack the heat sink so you do not damage the TIM.
2. Set the heat sink over the processor, lining up the four captive screws with the four posts surrounding the processor.
3. Loosely screw in the captive screws on the heat sink corners in a diagonal manner. Do not fully tighten one screw before tightening another.
4. Gradually and equally tighten each captive screw until all screws are tight.

Removing a Processor

1. Observe the safety and ESD precautions at the beginning of this book.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Remove the AC power cord(s) from the server.
4. Remove the chassis cover.
5. Remove the memory and processor air duct.
6. Loosen the four captive screws on the corners of the heat sink.
7. Twist the heat sink slightly to break the seal between the heat sink and the processor.
8. Lift the heat sink from the processor. If it does not pull up easily, twist the heat sink again. Do not force the heat sink from the processor. Doing so could damage the processor.
9. Open the load plate (see "Installing a processor").
10. Remove the processor.
11. If installing a replacement processor, see "Installing a processor." Otherwise, close the load plate, reinstall the heatsink(s), the memory and processor air duct and the chassis cover.

Installing or Removing a PCI Card

PCI cards can be installed into slots 1, 2, 3, 4, 5 and 6.

WARNING

Do not attempt to install or remove a PCI card without first turning off the system and disconnecting the power supply to the power supply module.

1. Remove the chassis cover.
2. From inside, open the latch on the blue PCI card socket at the rear of the chassis (A).
3. To install a PCI card, push the slot cover out from the rear of the chassis from inside (B).

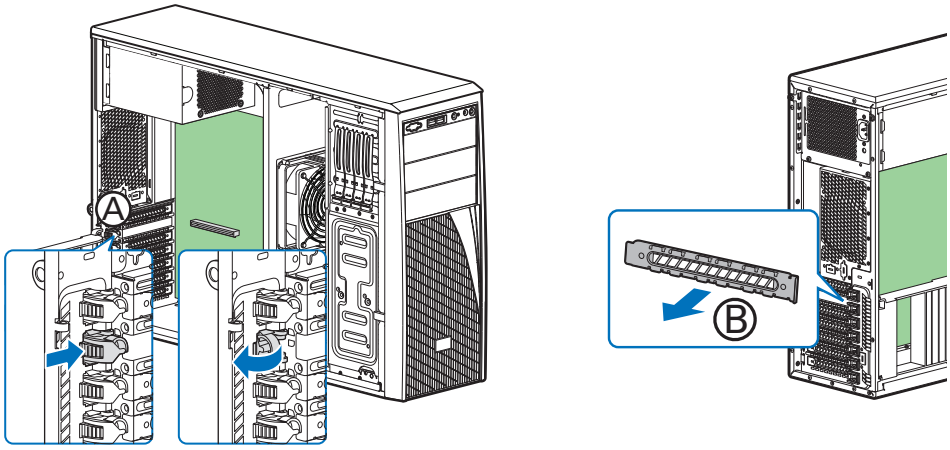

Figure 28. Preparing the chassis for PCI card installation

Replacing the Backup Battery

The lithium battery on the server board powers the RTC for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

⚠ **WARNING**

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

⚠ **ADVARSEL!**

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

⚠ **ADVARSEL**

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

⚠ **VARNING**

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

⚠ **VAROITUS**

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

⚠ **OSTRZEŻENIE**

Nieprawidłowa wymiana baterii grozi eksplozją. Wymieniać tylko na taki sam lub równoważny typ, zalecany przez producenta. Zużyte baterie utylizować zgodnie z instrukcjami producenta.

⚠ **WARNUNG**

Wenn eine ungeeignete Batterie eingesetzt wird oder die Batterie falsch eingesetzt wird, besteht Explosionsgefahr. Ersetzen Sie verbrauchte Batterien nur durch Batterien gleichen oder äquivalenten Typs, der vom Hersteller empfohlen wurde. Entsorgen Sie die verbrauchte Batterie entsprechend den Anweisungen des Herstellers.

⚠ **AVERTISSEMENT**

Danger d'explosion en cas de remplacement incorrect de la pile. Remplacez-la uniquement par une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettez au rebut les piles usagées en vous conformant aux instructions du fabricant.

1. Observe the safety and ESD precautions at the beginning of this book.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the AC power cord(s) from the server.
4. Remove the chassis cover and locate the battery.
5. Push the metal lever over the top of the battery to the side to disengage it from the battery.
6. While holding the lever away from the battery, lift the battery from its socket.

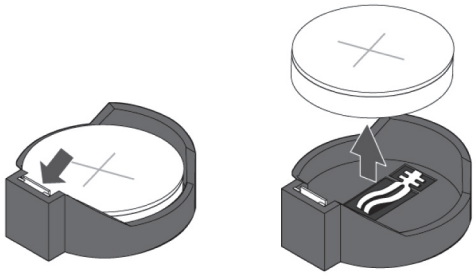

Figure 29. Replacing the backup battery

7. Dispose of the old battery according to local ordinance.
8. Remove the new lithium battery from its package, and observe the correct polarity. The printed side of the battery must face up, or toward the DIMM slots.
9. Insert the battery in the socket.
10. Close the chassis.
11. Run Setup to restore the configuration settings to the RTC.

Clearing the Password

If the user or administrator password(s) is lost or forgotten, moving the password clear jumper into the "clear" position clears both passwords. The password clear jumper must be restored to its original position before a new password(s) can be set.

1. Power down the server. Do not unplug the power cord.
2. Open the server chassis.
3. Move the jumper from the default operating position (covering pins 1 and 2) to the Password Clear position (covering pins 2 and 3).
4. Close the server chassis.
5. Power up the server and wait 10 seconds.
6. Power down the server.
7. Open the server chassis and move the jumper back to the default position (covering pins 1 and 2).
8. Close the server chassis.
9. Power up the server.

Recovering BIOS Defaults

If you are not able to access the BIOS setup screens, the BIOS Default jumper will need to be used to reset the system configuration.

1. Power down the system. Do not unplug the power cord.
2. Open the server chassis.
3. Move the jumper from the default operating position (covering pins 1 and 2) to the reset/clear position (covering pins 2 and 3).
4. Wait 5 seconds.
5. Unplug the power cord(s).
6. Move the jumper back to the default position (covering pins 1 and 2).
7. Close the server chassis.
8. Plug in the power cord(s) and power up the server.

6 Server Utilities

Using the BIOS Setup Utility

This section describes the BIOS Setup Utility options, which is used to change server configuration defaults. You can run BIOS Setup with or without an operating system present.

Starting Setup

You can enter and start BIOS Setup under several conditions:

- When you turn on the server, after POST completes the memory test
- When you have moved the CMOS jumper on the server board to the "Clear CMOS" position (enabled)

In the two conditions listed above, after rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

In a third condition, when CMOS/NVRAM has been corrupted, you will see other prompts but not the <F2> prompt:

```
Warning: CMOS checksum invalid
Warning: CMOS time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

If You Cannot Access Setup

If you are not able to access BIOS Setup, you might need to clear the CMOS memory. For instructions on clearing the CMOS, see "Clearing the CMOS".

Setup Menus

Each BIOS Setup menu page contains a number of features. Except for those features that are provided only to display automatically configured information, each feature is associated with a value field that contains user-selectable parameters. These parameters can be changed if the user has adequate security rights. If a value cannot be changed for any reason, the feature's value field is inaccessible.

Table 5 describes the keyboard commands you can use in the BIOS Setup menus.

Table 5. Keyboard commands

Press	Description
F1	Help – Pressing F1 on any menu invokes the general Help window.
← →	The left and right arrow keys are used to move between the major menu pages. The keys have no affect if a sub menu or pick list is displayed.
↑	Select Item up – The up arrow is used to select the previous value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.
↓	Select Item down – The down arrow is used to select the next value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.
F5/-	Change Value – The minus key or the F5 function key is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
F6/+	Change Value – The plus key or the F6 function key is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboard, but it has the same effect.
Enter	Execute Command – The Enter key is used to activate submenus when the selected feature is a sub menu, or to display a pick list if a selected feature has a value field, or to select a sub-field for multi-valued features like time and date. If a pick list is displayed, the Enter key will undo the pick list, and allow another selection in the parent menu.
Esc	Exit – The ESC key provides a mechanism for backing out of any field. This key will undo the pressing of the Enter key. When the ESC key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the ESC key is pressed in any sub menu, the parent menu is re-entered. When the ESC key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded.
F9	Setup Defaults – Pressing F9 causes the following to appear: Setup Confirmation Load default configuration now? [Yes] [No] If "Yes" is selected and the Enter key is pressed, all Setup fields are set to their default values. If "No" is selected and the Enter key is pressed, or if the ESC key is pressed, the user is returned to where they were before F9 was pressed without affecting any existing field values.
F10	Save and Exit – Pressing F10 causes the following message to appear: Setup Confirmation Save Configuration changes and exit now? [Yes] [No] If "Yes" is selected and the Enter key is pressed, all changes are saved and Setup is exited. If "No" is selected and the Enter key is pressed, or the ESC key is pressed, the user is returned to where they were before F10 was pressed without affecting any existing values.

7 Technical Reference

Power Supply Specifications

550 W Single Power Supply Input Voltages

- 100–240 V~ at 50–60 Hz; 10.0 A max.

550 W Single Power Supply Output Voltages

The table below lists the total wattage available from the power subsystem for each voltage.

Table 6. 550 W power supply system output capability

Voltage	Maximum Current
+3.3 V	18 A
+5 V	15 A
+5 V standby	3 A
+12 V (3 rails)	48 A (24/24/18 A A for one rail)
–12 V	0.5 A

CAUTION

The expansion slots on the server board are rated for no more than 25 Watts for any one slot. The average current usage per slot should not exceed 13 Watts.

750 W Redundant Power Supply Input Voltages

- 100–127 V~ at 50/60 Hz; 9.2 A max.
- 200–240 V~ at 50/60 Hz; 4.4 A max.

Efficiency

The following table shows the efficiency of the power supply with an input voltage of 230 V.

Table 7. Efficiency of the power supply

Load (% of maximum)	10 %	20 %	50 %	100 %
Efficiency	82 %	90 %	94 %	91 %

750 W Redundant Power Supply Output Voltages

The table below lists the total wattage available from the power subsystem for each voltage.

Table 8. 750 W power supply output rating

Voltage	Maximum Current
+3.3 V	25 A
+5 V	15 A
+5 V standby	3 A
+12 V (3 rails)	48 A (split into different connectors)/18 A/18 A
–12 V	0.5 A

CAUTION

The expansion slots on the server board are rated for no more than 25 Watts for any one slot. The average current usage per slot should not exceed 13 Watts.

System Environmental Specifications

Table 9. Environmental specifications

Temperature	**Non-operating**	–40 °C to 70 °C.
	Operating	5 °C to 30 °C; derated 0.5 °C for every 1000 ft (305 m) to a maximum of 10,000 ft.
Humidity	**Non-operating**	90 % relative humidity (non-condensing) at 30 °C.
Shock	**Operating**	2.0 g, 11 msec, 1/2 sine
	Packaged	Operational after an 18" free fall.
Acoustic noise		6 Bels in sound power for a typical office ambient temperature.
Electrostatic discharge (ESD)		Tested to 15 kilovolts (kV); no component damage.

8 Regulatory and Integration Information

Product Regulatory Compliance

Product Safety Compliance

The server complies with the following safety requirements:

- EN 60950 (European Union)
- IEC 60950 (International)
- CE – Low Voltage Directive (73/23/EEC) (European Union)

Product EMC Compliance

The server has been tested and verified to comply with the following electromagnetical compatibility (EMC) regulations:

- EN 55022 (Class A) – Radiated & Conducted Emissions (European Union)
- EN 55024 (Immunity) (European Union)
- CE – EMC Directive (89/336/EEC) (European Union)

Product Regulatory Compliance Markings

This product is marked with the following Product Certification Markings:

Table 10. Product certification markings

CE Mark	CE

Product RoHS Compliance

Restriction of Hazardous Substances: This server system is compliant to European Directive 2002/95/EC (RoHS).

Installation Precautions

Observe all warnings and cautions in the installation instructions.

To avoid injury, be careful of:

- Sharp pins on connectors
- Sharp pins on printed circuit assemblies
- Rough edges and sharp corners on the chassis
- Hot components (like processors, voltage regulators, and heat sinks)
- Damage to wires that could cause a short circuit

Refer computer servicing to qualified technical personnel.

Installation Requirements

CAUTION

Follow these guidelines to meet safety and regulatory requirements when installing this board assembly.

Read and adhere to all of these instructions and the instructions supplied with the chassis and associated modules. If the instructions for the chassis are inconsistent with these instructions or the instructions for associated modules, contact the supplier's technical support to find out how you can ensure that your computer meets safety and regulatory requirements. If you do not follow these instructions and the instructions provided by chassis and module suppliers, you increase safety risk and the possibility of noncompliance with regional laws and regulations.

Prevent Power Supply Overload

Do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current loads of all the modules within the computer is less than the output current rating of each of the power supplies output circuits.

Place Battery Marking

There is insufficient space on this server board to provide instructions for replacing and disposing of the battery. For system safety certification, the following statement or equivalent statement may be required to be placed permanently and legibly on the chassis near the battery.

CAUTION

Risk of explosion if battery is incorrectly replaced.

Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Use Only for Intended Applications

This server was evaluated as Information Technology Equipment (I.T.E.) for use in offices, homes, schools, computer rooms, and similar locations. The suitability of this product for other applications or environments, (such as medical, industrial, alarm systems, test equipment, etc.) may require further evaluation.

Power and Electrical Warnings

CAUTION

The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.

When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the server.

To avoid risk of electric shock, turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it.

The power supply cord(s) is/are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.

The power supply cord(s) must be plugged into socket-outlet(s) that is/are provided with a suitable earth ground.

Rack Mount Warnings

The equipment rack must be anchored to an unmovable support to prevent it from tipping when a server or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.

Install equipment in the rack from the bottom up, with the heaviest equipment at the bottom of the rack.

Extend only one piece of equipment from the rack at a time.

You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.